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Editor: Izabela Albrycht

Edition completed: July 2012

Editorial assistant: Maria Guzewska



Translation: Adam Łazarski (Chapters 1, 3, 4), Zuzanna Łopacińska-Piędel (Introduction, Key Findings and Recommendations, Chapters 2, 3, 6, 7, 8, 9, 10, 11), Justyna Kruk (Chapter 5), DLA Piper (Chapter 12), Ben Koschalka (Chapter 13).

Proofreading: Maria Guzewska, Zuzanna Łopacińska-Piędel

Layout & typesetting: Małgorzata Kopecka

Print: Dante Media

The Kosciuszko Institute
ul. Lenartowicza 7/4
31-138 Kraków
e-mail: ik@ik.org.pl
+48 12 632 97 24
www.ik.org.pl

ISBN: 978-83-63712-03-7

# Contents

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# Introduction

Izabela Albrycht – chairperson of the Kosciuszko Institute

## Examining the Unconventional Gas Revolution: From Global to Local

The unconventional gas revolution, which originated in the U.S. and Canada, has spread across the world. It is now a global phenomenon. More and more countries are actively engaged in developing the shale gas sector, including the United Kingdom, China, Russia, India, Mexico and Argentina. These are just some of the countries that are likely to have a significant impact on the dynamics of regional and ultimately global energy markets. Albeit in each of these countries the shale gas sector's development is conditioned by different factors, unconventional technologies of resources extraction will first revolutionize regional gas markets and within several years the revolution will encompass global gas, and then oil markets. Only time will tell which of these resource revolutions will have a stronger effect on global economic development.

For now, only one thing is clear: neither Poland, nor Europe should turn their backs on possible energy, economic, social and political benefits that have so far been enjoyed by beneficiaries of shale revolutions.

In the present report, which includes analysis of the history, market and socio-economic considerations of shale gas extraction in the U.S. and Canada, we also offer our readers the chance to move from global approaches to the unconventional gas sector, and to take a more local perspective. The shale success story started in U.S. states and Canadian provinces. Texas, Pennsylvania and British Columbia are where the revolution's positive footprint was felt first and felt the strongest. Pomerania or the region of Lublin in the south-west of Poland is now likely to play an important role in the history of development of the shale gas sector in Poland, and Europe.

The present report, a subsequent publication of the Kosciuszko Institute on unconventional gas, focuses above all on presenting the history of shale gas extraction in the U.S. and Canada, as well as the scale and types of social, economic and energy benefits stemming from its development, from both a national and regional perspective. The analysis of the benefits will be based on the most recent economic data and results of social surveys of the positive perceptions resulting from the shale gas sector's operations on the American economy and society.

The analysis of the U.S. shale gas sector will be the starting point for presenting the differences and similarities between the conventional and the unconventional gas sectors, and providing a list of risk areas that might significantly affect the development of the shale gas sector in Poland, and its broader impact on the economy. A substantial part of the publication is devoted to the analysis of the experiences of the Polish regions where conventional gas mines and underground gas storage facilities are located. The impact assessment demonstrates that there are significant socio-economic benefits for the regions stemming from the operations of the oil and gas extraction sector.

This part of the report also includes a preliminary projection of the impact of shale gas development on the job market. Moreover, it includes a list of other probable socio-economic benefits resulting from the shale gas sector's development in Poland, as well as a set of recommendations for Polish decision makers, aimed at generating added value from shale gas extraction for local governments, and achieving a maximal multiplier effect for the Polish economy. The final part of the present publication is devoted to a unique qualitative sociological research undertaken to examine the perception of benefits and benefits/losses stemming from conventional gas exploitation in Poland among local communities.

The examination includes not only positive North American experiences, but also an analysis of economic data from Polish extraction regions, coupled with results of interviews with members of local communities living in those regions show that operations of the natural gas sector may benefit socio-economic development of Polish regions in multiple ways. Results of studies and analyses undertaken by experts of the Kosciuszko Institute included in the present report provide substantial factual support for a positive view to be taken of current, early stage of the development of the shale gas sector in Poland. This factual assessment is well-worth reading and hopefully will impact upon the public debate.

As the North American example shows, knowledge of benefits and consequences resulting from the shale gas exploration and production sector are likely to have a significant impact on the national debate. The Polish government, as well as NGOs and energy companies, bearing in mind the development of the unconventional gas sector, should make local communities and Polish citizens at large aware that they may become direct and indirect beneficiaries of the project, for example thanks to lower gas and energy prices, reduction of unemployment and higher revenues for local budgets. Engagement of Polish local communities in supporting the sector's development is of key importance, in order to ensure a Polish shale gas success story.

One of the foremost recommendations of the Kosciuszko Institute for the government is to prepare and implement a factual and not emotional information campaign on socio-economic impact of the shale gas sector aimed at enhancing the development of this particular economy sector. Other key recommendations include: incorporating shale gas into Polish energy strategy as the second resource, after coal (in the present document entitled "Energy Policy of Poland until 2030" there is not a single word about shale gas!); the need to intensify legislative work on establishing simple and sensible legal and tax regulations, as well as a clear and effective division of competences and responsibilities for supporting the shale sector's development at the level of central administration; the need to provide training and education for young engineers and technicians, and create a shale gas R&D sector supporting the extraction sector that might be financed by the EU and energy companies; the need to ensure development opportunities of the shale sector from the financial point of view through creation of a healthy investment climate. The contract signed on 4th July 2012 by PGNiG SA, KGHM Polska Miedź SA, PGE SA, Tauron Polska Energia SA and Enea SA on exploration and production of shale gas (so-called KCT contract; the name stems from the names of the rig pads located in the Wejherowo concession area of PGNiG SA: Kochanowo, Częstkowo, Tępcz) is a significant milestone. The development of the shale gas sector in Poland is an unprecedented investment. It requires an approach that would make it possible to achieve both scale effect and synergy. Further steps should be undertaken promptly with the aim of creating the optimum conditions for long-term development of the shale gas exploration and production sector in Poland. The key role in this respect will be played by the necessary know-how acquired by national oil and gas companies, which can be fostered through partnerships with international oil and gas companies with a proven extraction track record in North America. From the point of view of the Polish companies, this can bring additional benefits including risk mitigation, if the cooperation entails exchanging shares in concessions. Only then will the Polish state be able to take on its shoulders the organizational and financial burden of the enormous investments required, including drilling hundreds of wells and the development of the transmission infrastructure.

As the commendable history and tradition of natural gas extraction in Poland, also described in the present report, shows that our country can in some respects become the pioneer of shale gas development in Europe and within a few years may feel the positive effects of its shale success story. We should all be aware that we could all be winners in the global unconventional energy revolution.

The benefits for the regions, as well as the whole economy at large, stemming from the shale gas sector's development, should be an additional stimulus for the Polish government to boost the long-term strength of the economy.

I would like to take this opportunity to thank all the authors for their contribution.

# Key Findings and Recommendations for the Shale Gas Exploration and Production Sector in Poland from the Perspective of Local Governments*

Izabela Albrycht

The analysis of economic and social considerations related to exploration and exploitation of unconventional gas in Poland and its individual regions, performed for the purpose of the current report, shows that the shale gas exploration and production sector, currently in its infancy, may become a chance for development of the Polish economy and local governments. It is very probable that North American experiences and positive socio-economic and political effects of the shale gas revolution could be present, albeit on a smaller scale, in Poland.

Not only the oil and gas companies, but also local communities, state authorities, small and medium-sized companies and individual customers benefited from the shale boom in the U.S.A s a result the whole U.S. economy benefited from that process. The U.S. situation may be best described by the term "win-win", i.e. bilateral, or in that case multilateral, victory.

The shale gas success, achieved thanks to the win-win strategy, can be repeated in Poland. It is even more probable, as Poland has a long tradition of hydrocarbon extraction, and thus gains benefits from conventional gas production, which should be emphasized to stakeholders and beneficiaries of the new unconventional exploration and production sector.

## Impact Assessment of the Natural Gas Sector in Poland, Including Conventional Gas Mines and Underground Gas Storage Facilities on the Local Economic Processes

The impact assessment of the natural gas extraction sector on the local economic processes in Poland, prepared by the Kosciuszko Institute, included two Big Regions. The Northern Region encompassed mostly: the Greater Poland Voivodeship, the West Pomeranian Voivodeship and the Kuyavian-Pomeranian Voivodeship, while the Southern Region: mostly the Sub-Carpathian Voivodeship. Within the Big Regions, small regions (*gminas* and *poviats*, i.e. the two smallest administrative units in Poland) with gas mines or underground gas storage facilities were taken into consideration. Big Regions differ between each other not only as to their characteristics, but also the level of development, geopolitical location and historical conditions, which still impact their level of development. Moreover, the extent to which the extraction sector is developed is of major importance: its long-standing presence in the Southern Region and the dynamic growth in the Northern Region.

**Revenues of Local Governments**

*Gminas* obtain their own revenues from their share in income taxes (PIT and CIT), as well as real estate tax, exploitation fee (on the basis of the Act on the Geological and Mining Law), and local taxes. In the majority of *gminas* included in the impact assessment, the presence of a gas mine or an underground gas storage facility increases the *gmina's* own revenues. The index representing own income *per capita* in such regions is approx. 5-15% higher than in comparable *gminas* in the given voivodeship. In Dębno (myśliborski *poviat*, West Pomeranian Voivodeship), where an oil and gas mine is located, *gmina's* own revenues are 18% higher and total revenues are 5% higher than in other *gminas* in the West Pomeranian Voivodeship.

An average share of exploitation fee in *gminas'* revenues in Poland reaches approx. 0.4%. For comparison, in:

- Dębno, the share exceeds 12% (8.3 million PLN in 2010),
- Kościan (kościański *poviat*, the Greater Poland Voivodeship) the share equals 3.3% (1.2 million PLN in 2010),
- Mogilno (mogileński *poviat*, Kuyavian-Pomeranian Voivodeship) the share equals 1.7% (1.1 million PLN in 2010).

High tax revenues for local budgets, however, start a mechanism of revenue redistribution, commonly known as the "Robin Hood fee" (Polish: "*janosikowe*"). *Gminas* where gas mines and underground gas storage facilities are located obtain relatively low sums in subsidies. Moreover, they are a net payer for the inter-regional redistribution system. Only Dębno, where the biggest oil and gas mine in Poland is operating, has revenues approx. 5% higher than other similar regions in the voivodeship. On the basis of available data it is not possible to analyze solely the impact of natural gas extraction (without oil extraction) on local governments' budgets.

**Expenses of Local Governments**

From the point of view of mid- and long-term regional development, it is important for the local governments to allocate more to investments that foster development, i.e. ones that can improve the quality of life and attract big companies to local markets. In the Southern Region, *gminas* where gas mines or underground gas storage facilities are located earmark 22.1% of their total expenses to investments, whereas the remaining comparable *gminas* in the Region only 17.5%.

In the Northern Region, activities of local governments which benefit from the presence of gas mines or underground gas storage facilities are noticeable. In the Greater Poland Voivodship, such *gminas* allocate on average 15% of their expenditures to investments, whereas other similar local governments – 14%. Attention should be drawn to great variability of the index: the values in individual *gminas* vary from 1% to 42%. In Mogilno (underground gas storage facility), investment activity of the local government is even more noticeable: investment expenditures account for 21.5% of total expenses, with the average in the Kuyavian-Pomeranian Voivodeship being 18%.



**Wealth of the Society**

Revenues of local governments from income taxes, apart from their fiscal function, are also a source of information about the pay grades. In the Southern Region, an average pay in *gminas* where gas mines or underground gas storage facilities are located is approx. 12% higher than in similar *gminas* in the Sub-Carpathian Voivodeship. Local payrolls in *gminas* where the extraction sector is operating are similar to comparable *gminas* without gas mines. Only in Mogilno (underground gas storage facility) is the average pay approx. 7% higher than in the case of similar *gminas* in the Kuyavian-Pomeranian Voivodeship.

**Labor Market**

The impact assessment conducted shows that the functioning of a gas mine and an underground gas storage facility does not necessarily translate into a significant improvement on the local labor market. Undoubtedly, it can increase the likelihood of job creation. In the Southern Region, in *poviats* where gas mines or underground gas storage facilities are located, average unemployment rate (in the years 2004-2011) was approx. 18%, whereas in the remaining *poviats* (without operations of PGNiG SA) it equaled 15%.

In the Northern Region, in the Greater Poland Voivodeship, the situation on local job markets improves significantly when oil and gas companies intensify their operations: average unemployment rate in such regions equaled 8.5% versus 10.3% in other *poviats*. In the West Pomeranian Voivodeship, in myśliborski *poviat* (BMB gas field), average unemployment rate was 18.2%, while in other *poviats* of the voivodeship it equaled 22.3%. In other regions, the presence of a gas mine or underground gas storage facilities does not translate into a considerable improvement on the labor market: in mogileński *poviat*, the average unemployment rate was insignificantly higher than the voivodeship average. The situation is similar in milicki and górowski *poviats* (Lower Silesian Voivodeship).

**Economic Entities**

The condition on the local labor market is profoundly impacted by the number of economic entities who are potential employers in the region. In 2010, in the Sub-Carpathian Voivodeship, in *poviats* where gas mines or underground gas storage facilities operate, the number of economic entities per 10,000 inhabitants equaled 619, whereas in other *poviats* – 724. The index of newly registered entities was similar: 65 versus 79 per 10,000 inhabitants respectively. The correlations prove that in the Southern Region, despite the presence of gas deposits, there are no stimuli for setting up companies. Such a low level of economic activization has a negative impact on the local labor markets. Therefore, high unemployment rates in the region should be linked to the shortage of companies.

The situation in Greater Poland is totally different: *poviats* where the extraction sector is present have a higher number of economic entities than other. Voivodeship-wise, in 2010, the number of entities per 10,000 inhabitants equaled 875, and in regions with an existing extraction sector – 965. The dynamism of establishing new companies is also higher: 96 versus 97 newly created entities per 10,000 inhabitants.